DOCUMENT RESUME

ED 342 355 IR 013 598

AUTHOR Merriman, Howard
TITLE One Computer for Every Teacher and Every Student.
PUB DATE Nov 87
NOTE 12p.; Paper presented at the NSBA-ITTE Conference (Dallas, TX, November 4-7, 1987). For a report on another Apple Classroom of Tomorrow, see ED 295 600.
PUB TYPE Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; Computer Networks; Computer Software; Equipment Maintenance; High Schools; *High School Students; Individualized Instruction; *Microcomputers; *Secondary School Teachers; Team Teaching
IDENTIFIERS *Apple Classrooms of Tomorrow; *Apple Macintosh

ABSTRACT

This report describes the Apple Classroom of Tomorrow (ACOT) project as it was in its second year in a comprehensive high school, Macintosh-based site in Columbus, Ohio, with 30 sophomore students. It is noted that all of the students in the ACOT classroom--who are selected by lottery from among applicants of the school's resident population--have a microcomputer at school and at home, a dramatic departure from the average 20 minutes per week access time upon which many studies of computer effectiveness are based. Topics discussed in this report include: (1) the benefits of having unrestricted access to a computer that have accrued to these students and teachers, to the institutional setting, and to the system; (2) the expected outcome of turning out high school graduates who have lived in a microcomputer-saturated environment for four years; (3) the overall lessons of this experience; (4) issues related to extending the saturation level of microcomputers in school laboratories and classrooms; (5) the limitations of shared computers; and (6) the need for an evaluation of instructional technology. The report concludes with an analogy between technology and business in which both people and the environment are enhanced and supported. (CGD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED342355

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ONE COMPUTER FOR EVERY TEACHER AND EVERY STUDENT

presented at

The NSBA-ITTE Conference
November 4-7, 1987
Dallas, Texas

by

Howard Merriman, Ph.D.
Assistant Superintendent
The Columbus Public Schools
and
Adjunct Professor
College of Education
The Ohio State University

IR013598

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Howard Merriman

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

ONE COMPUTER FOR EVERY TEACHER AND EVERY STUDENT

Two hundred years ago we could have asked a question about what would happen to students and teachers if every student and teacher had their own pencil or book. Today we can ask the question--what could happen if every teacher and student had their own computer?

Who could have the audacity to talk about one computer for every teacher and every student? Who could pretend that this can really happen? Why should anyone even become interested, since this is such a long shot?

Well, it can happen and is happening now, although on a limited scale. In Columbus and several other sites, students have their own microcomputer all day, every day--in school and at home.

The Columbus Public Schools Apple Classroom of Tomorrow is a high school, Macintosh-based site. As such, it is different from the other ACOT sites, which are elementary and middle schools and Apple II family microcomputers. Every student in our ACOT classroom has a Mac at school and at home--24 hours a day, 7 days a week, 365 days a year. This is a dramatic departure from the average 20 minutes per week access time that many studies of computer effectiveness are based upon.

The ACOT classroom is now in its second year. Last year's freshman class of 30 has moved on to being sophomores, and a new freshman class has begun. Students are selected by lottery from among applicants of the school's resident population. It's not a magnet school or an alternative school. It's a plain old comprehensive high school, with a total 9-12 enrollment of 1,561, of

which 31.7% are black and 68.3% non-black. 32.6% are on free and reduced price lunch. Overall, the district has a high school enrollment of 17,805, of which 46.4% are black, 53.6% non-black, with 32.2% on free and reduced price lunch. The ACOT classroom students represent the school's statistics--male-female evenly split. The only exception is that ninth grade students must agree to take algebra and physical science. Last year, 16 of the 30 agreed to take these courses who normally would not have.

Columbus has the same problem to some extent of most other school districts--algebra failures run approximately 30% of those taking the course. In the ACOT classroom, all but one of the 30 passed the course--and, as I said, 16 of the 30 would have chosen not to take it. This is but one example of changes in student expectations. One which, however, can have a profound effect on a student's future access to educational and career opportunities.

Benefits

A first question generally asked by someone of a new program proposal is "What benefits can be derived from what you are proposing to do which cannot be obtained by the present means of operation?" In the case of the Apple Classroom of Tomorrow, benefits to students which have been observed and measured in a qualitative sense over the past year include greater self-esteem, higher self-expectations, higher career expectations and changes in parent expectations. Students have also acquired skills in keyboarding, word processing, the use of a spreadsheet and data base management. Students have taken courses and completed them which they would not have otherwise done.

What kinds of benefits accrue to teachers and to the instructional setting? One teacher on the staff recently said, "It's fun, but a lot of hard work--it's hard work, but a lot of fun." Last year, four teachers taught basic subjects to students (language arts, including writing, social studies, physical science and algebra) in a team teaching setting. Teachers also were in a team teaching mode with one of the several possible pairs of teachers always in the classroom. Some days math was taught in conjunction with social studies and other days physical science taught with language arts. The more common pairings were math and physical science and social studies with language arts. These same teachers also were responsible for teaching four other classes apiece in a conventional classroom, in a conventional manner. There is no doubt that changes occurred in teaching behavior in the conventional classroom due to positive changes which occurred in the technology-based Apple Classroom of Tomorrow. It was necessary in the ACOT classroom for every student to be an individualized challenge. Teachers shifted from teaching content to teaching students. Obviously, we are learning a lot about a high school team teaching model. The organization of a small team of teachers with 30 students in a large comprehensive high school bears much promise for individual identity in an academic setting not unlike that found in the athletic team model. One immediate measure of success from an external source was the selection of the West High School ACOT Classroom as a National Center of Excellence by the National Council of Teachers of English.

As a benefit to the system, the teachers in the program promise to be models for establishing cadres for team teaching in our other high schools. Managing the problems of two saturated classrooms as we have today--software, network, hardware and peripherals--is telling us a lot about the magnitude of support that would be required on a larger scale implementation.

The notion of unrestricted access is appealing because we no longer have the equity-fairness issues. We can then deal with what does happen with saturation: familiarity, in fact, intimacy with "my" machine. The keyboard and memory quirks, the touch and feel of a machine seems to become a highly personalized relationship with the unit. Creative problem-solving and uses which the administrators and teachers have not thought of come from the extreme expertise, dedication and staying up all night with the machine. How many of you are skilled on a skateboard? Have you ever watched the teenagers on the streets, in shopping malls and playgrounds flip, reverse and remount a skateboard without falling? Can you do this? I can't. I don't even want to try. It is an acquired talent. It results from hours of practice and is the same kind of thing that will occur through students having extensive access to microcomputers. They will do things we have not thought of, they will do things we don't want to think of and certainly won't try.

When students are interviewed, some become more formal in reporting what benefits they perceive from having access to the microcomputer all day, all night, all week, all month, all year. They talk about better use of their time. In management terms, this is time management. They perceive themselves to be more

effective and more productive in the use of their time. They talk about being better organized. They talk about using their microcomputer to organize their class notes for review. They talk about using the computer to prepare their homework in a more organized way. They talk about making more effective, polished presentations in reports to their classroom teachers and the classroom teachers have come to expect more polished, complete, effectively presented materials from their students. If we look at some of the things that seem to underlie a situation of this sort, it becomes apparent that a student with poor handwriting or who is not an accomplished typist is not as severely limited in written communications. The handwriting problem or typing problem does not get in the way of judgments on the quality of content. Students are less reluctant to edit because editing does not require complete rewriting by hand or retyping whole pages of a manuscript. Experience shows that more revision and reorganization of student material leads to better quality writing. As a consequence, the ideas being expressed can become more important than form. This amounts to being a removal of barriers to creativity and provides for the use of time for creative activity.

Teachers find the students to be "better than they thought they could be," and outside observers are amazed at the sophistication they see. We continue to be surprised at the speed of assimilation of new applications by the students. The teachers had planned units for several weeks on data base, and found the class done with the material in two days.

We probably don't know what we can accomplish yet. There are boxes of data, a full book-length report and several evaluation studies currently in preparation, soon to be ready.

In 1988, we are scheduled to add a new freshman class, and in 1989, another new freshman class. The Columbus Apple Classroom of Tomorrow will then have 30 Freshmen, 30 Sophomores, 30 Juniors and 30 Seniors. We will have the first high school graduates to have lived in a microcomputer-saturated environment for four years--at school and at home. What will the overall lessons be?

Issues

There are many issues related to extending the saturation level of microcomputers beyond labs of microcomputers in every school and beyond microcomputers in every classroom. Pre-service and in-service training is required both in use of hardware and software, to familiarize the classroom teacher with hardware to the point that it is as simple to them as the chalkboard and familiarity in using software for lesson units without having to spend hours and days finding it and learning to use it.

Maintenance is a necessary evil. Setting up equipment, moving equipment, inventorying equipment and keeping it all going beyond the warranty period is a very extensive and could be an expensive proposition to the school district without having a successfully negotiated maintenance agreement or an in-house capacity.

Furniture is required to hold equipment. We have emptied warehouses and storage rooms of various kinds of unused furniture to hold microcomputers. More microcomputers now means that we are having to buy furniture to hold them. Knowledge of what kind of furniture works in what situations effectively is critical.

Providing power to one lab in a secondary building is not a serious problem. Most labs of 15 units in a school draw no more current than an electric iron or a large blow dryer. It has not been difficult to get one or two additional outlets put in a room to accommodate these labs. Difficulties begin to occur when other rooms are involved. We found rooms in which there is but one outlet (in the wrong place). We have found rooms in which an outlet shares the same circuit as its companion outlet in the room adjacent. We have found outlets which are not grounded. As a consequence, if we begin to spread microcomputers beyond the confines of one lab, not only does it affect single room wiring but the overall load requirements for the whole building.

Security is fairly easy to provide for a confined location in a building. Placement of early labs was often dictated by the location of a room in a building which could not be accessed from an adjoining roof, outside through an easily broken window, or hallway door. Security devices have been installed in most buildings now with provision for special devices protecting the computer lab. As machines are placed in other classrooms in the building, the ability to secure becomes harder.

The type of software, the distribution of software, the support for upgrades of software, the cataloging of software and just plain finding software when you need it is already a big problem. Using library techniques to catalog inventory and control software at a building level seems to have the most promise. At the system level, it is hoped that system site licensing will provide for easier means of software management than presently exists.

Blank disks to be used as data disks by individual students are a large supply item. Our district has probably purchased in excess of a quarter million disks the past several years.

The whole issue of networks in a classroom, between classrooms, between classrooms and a media center, linking classrooms and the office, and finally linking schools to the school system and a gateway to the outside world of data bases, computer bulletin boards and electronic mail requires a great deal of experimentation and use.

Peripherals to support the larger scale implementation of microcomputers would include printers, VCR's, video disk players, scanners, digitizers and the MIDI music interface. Little is known at present as to what and how much is really needed in a school to provide for effective instruction. It would be important to know what ratio of printers to microcomputers would be necessary in a saturated setting, etc., etc.

The Ohio Avenue School of the Future

To pursue answers of this question one could write a "theory" paper, look for statements by experts in the field and suggest that an ideal program configuration for a school might be "such and such." We believe that it is absolutely necessary for our school system to get first-hand, hands-on experience with a larger-scale, saturated setting. We have deliberately chosen a school which is an old building in an average setting. The school is desegregated. The students are not exceptional and they are in the school because it is their residential school assignment. During the 1986-87 school year, the building had a computer lab of 15 IIe's. They are starting this school year

with a lab of 29 IIe's. Previously students had worked in pairs. We said that peer teaching was also important in the use of the microcomputer as an instructional tool. That was a good way to rationalize when we could not buy more than 15 and our class size was 30. A shortcoming of two-on-one is that when students are doing highly individualized work or are engaged in a creative activity such as writing, two-on-one just does not work. It is almost like having one pencil for every two kids and having to pass the pencil back and forth every 15 minutes. We presently have on order and expect to receive any day additional computers to place one per classroom so that computers are accessible in each classroom in between visits to the lab. Is this enough? We don't think so. We think the teacher is going to say students do not have enough access time in my classroom. As a consequence, our next order will include two more IIe's for each classroom to make it possible to set up classroom-based learning centers on which we can run the Apple Learning Series materials. Is this enough? We don't think so, because these installations will not answer the more significant questions, that is, what benefits can we obtain when students have unlimited access during the school day to their own microcomputer? We are now working with several organizations to attempt to bring this seven-to-one ratio down to a one-to-one ratio. I only need 333 more microcomputers to do this for one building. Next year I'll come back and tell you how we solved all these problems.

I want to talk about evaluation. I have a doctorate in evaluation and research. I want to make it clear that I don't believe instructional technology should have a free ride forever.

But, I believe that technology may be expected to do things that should not be anticipated. Some legislative, business and industrial leaders believe that utilization of technology in the schools could fill the needs for science and math teachers which are in short supply--or to reduce costs in education by teaching more faster by computer. Some educators endorse this as a solution to undoubted problems. These and others seek to measure the efficacy of technology in the schools by finding equal or greater productivity for the same amount of dollars.

Let's put this in perspective. Let's assume technology to be a potentially effective tool which enhances teaching and learning. What's the business analogy? In marketing or sales, the technology could be the 1-800 numbers which can be used by customers to place orders; a computer could be used by a salesman to place a customer's order by modem or to check warehouse inventory available for immediate delivery; a computer-desktop publisher could be used to prepare sales brochures--all enhancements, not necessarily replacements for sales or marketing people. Teachers are like sales people. They interact with the clients, their customers, their students. Technology does not replace the salesperson, it enhances the sale; it supports the salesperson.